

1           1. (Amended) A data stream compression apparatus comprising  
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3       a data stream processing element for receiving a first stream of data entities at a  
4       first line rate, each data entity including a data packet and a gap, and responsive to  
5       a control signal for generating a second stream of data entities at a second line  
6       rate which is less than the first line rate, each second stream data entity including  
7       a data packet and a gap,  
8  
9       a control unit for providing said control signal identifying a predetermined portion  
10      of non-unique, invariant content of said first stream of data entities, said  
11      predetermined portion of non-unique, invariant content being identified using pre-  
12      knowledge of the type of said first stream of data entities, and  
13  
14      wherein said data stream processing element in response to said control signal  
15      removes said predetermined portion of non-unique, invariant content from a data  
16      packet or gap of one or more data entities of said first stream of data entities  
17      thereby generating said second data stream of data entities at the second line rate.

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2           2. (Original) The data stream compression apparatus of claim 1 wherein  
3       the non-unique, invariant content of said first data stream is determined in real-  
4       time.

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1           3. (Original) The data stream compression apparatus of claim 1 wherein  
2 the non-unique, invariant content includes one or more interpacket characters.

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1           4. (Original) The data stream compression apparatus of claim 1 wherein  
2 said first data stream is gigabit Ethernet data stream and the non-unique, invariant  
3 content includes one or more PREAMBLE characters.

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1           5. (Original) The data stream compression apparatus of claim 1 wherein  
2 said first data stream is gigabit Ethernet data stream and the non-unique, invariant  
3 content includes one or more IDLE2 characters.

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1           6. (Original) The data stream compression apparatus of claim 1 wherein  
2 said non-unique, invariant content of said first stream of data entities has been  
3 predetermined.

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1           7. (Original) The data stream compression apparatus of claim 1 being part  
2 of a data communication system including said data stream compression  
3 apparatus connected to transmit said second data stream over a communication  
4 link to a data stream expansion apparatus, said data stream expansion apparatus  
5 comprising

6

7 a data stream processing element for receiving said second data stream of data  
8 entities from the communication link at a second line rate and responsive to a  
9 control signal for generating a first stream of data entities at a first line rate which  
10 is greater than the second line rate,  
11  
12 a control unit for providing said control signal identifying a predetermined portion  
13 of non-unique, invariant content which is to be added to said second data stream  
14 of data entities, and  
15  
16 wherein said data stream processing element in response to said control signal  
17 adds said predetermined portion of non-unique, invariant content to said second  
18 data stream of data entities thereby generating said first data stream of data  
19 entities at the first line rate.

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1 8. (Amended) A data stream expansion apparatus comprising

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3 a data stream processing element for receiving a second data stream of data  
4 entities at a second line rate, each data entity including a data packet and a gap,  
5 and responsive to a control signal for generating a first stream of data entities at a  
6 first line rate which is greater than the second line rate,  
7

7

8 a control unit for providing said control signal identifying a predetermined portion  
9 of non-unique, invariant content which is to be added to said second data stream  
10 of data entities, said control unit using pre-knowledge to identify said  
11 predetermined portion of non-unique, invariant content which is to be added to  
12 said second data stream of data entities, and  
13  
14 wherein said data stream processing element in response to said control signal  
15 adds said predetermined portion of non-unique, invariant content to a data packet  
16 or gap of one or more data entities of said second data stream of data entities  
17 thereby generating said first data stream of data entities at the first line rate.

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1 9. (Original) The data stream compression apparatus of claim 8 wherein  
2 the non-unique, invariant content of said first data stream is determined in real-  
3 time.

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1 10. (Original) The data stream compression apparatus of claim 8 wherein  
2 the non-unique, invariant content includes one or more interpacket characters.

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1 11. (Original) The data stream compression apparatus of claim 8 wherein  
2 said first data stream is gigabit Ethernet data stream and the non-unique, invariant  
3 content includes one or more PREAMBLE characters.

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1           12. (Original) The data stream compression apparatus of claim 8 wherein  
2       said first data stream is gigabit Ethernet data stream and the non-unique, invariant  
3       content includes one or more IDLE2 characters.

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1           13. (Original) The data stream compression apparatus of claim 8 wherein  
2       said non-unique, invariant content of said first stream of data entities has been  
3       predetermined.

1           14. (Amended) A data compression multiplexer apparatus comprising  
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3       (1) a plurality of data stream compression apparatuses, each comprising  
4  
5       a data stream processing element for receiving a first data stream of data entities  
6       at a first line rate, each data entity including a data packet and a gap, and  
7       responsive to a control signal for generating a second stream of data entities at a  
8       second line rate which is less than the first line rate, each second stream data  
9       entity including a data packet and a gap,

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11           a control unit for providing said control signal identifying a predetermined  
12       portion of non-unique, invariant content of said first stream of data entities; said

13 predetermined portion of non-unique, invariant content being identified using pre-  
14 knowledge of the type of said first stream of data entities, and

15

16 wherein said data stream processing element in response to said control  
17 signal removes said predetermined portion of non-unique, invariant content from  
18 a data packet or gap of one or more data entities of said first stream of data  
19 entities thereby generating said second data stream of data entities at the second  
20 line rate, and

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22 (2) a data stream multiplexer for multiplexing said plurality of second data  
23 streams to generate a multiplexed data stream.

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1 15. (Amended) A data compression multiplexer apparatus comprising

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3 (1) a plurality of data stream compression apparatuses, each comprising

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5 a data stream processing element for receiving a first data stream of data  
6 entities at a first line rate, each data entity including a data packet and a gap, and  
7 responsive to a control signal for generating a second stream of data entities at a  
8 second line rate which is less than the first line rate.

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10        a control unit for providing said control signal identifying a predetermined  
11        portion of non-unique, invariant content of said first stream of data entities, and

12  
13        wherein said data stream processing element in response to said control  
14        signal removes said predetermined portion of non-unique, invariant content of  
15        said first stream of data entities thereby generating said second data stream of data  
16        entities at the second line rate, and

17  
18        (2) a data stream multiplexer for multiplexing said plurality of second data  
19        streams to generate a multiplexed data stream, The the data compression  
20        multiplexer apparatus of claim 14 including further comprising

21        eight data stream compression apparatuses,

22        wherein each said first data stream is a gigabit Ethernet data stream at 1.25  
23        Gb/s, and

24        wherein said multiplexed data stream generated by said data stream  
25        multiplexer is less than or equal to the SONET OC-192 line rate.

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1        16. (Original) The data compression multiplexer apparatus of claim 14  
2        being part of a data communication system including said data compression  
3        multiplexer apparatus connected to transmit said multiplexed data stream over a  
4        communication link to a data expansion demultiplexer apparatus, the data  
5        expansion demultiplexer apparatus comprising

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7 (1) a data stream demultiplexer for demultiplexing a received multiplexed data

8 stream from the communication link into a plurality of second data streams and

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10 (2) a plurality of data stream expander apparatuses, each for processing one of the

11 plurality of second data streams, each data stream expander apparatus including

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13 a data stream processing element for receiving a second data stream of

14 data entities at a second line rate and responsive to a control signal for generating

15 a first stream of data entities at a first line rate which is greater than the second

16 line rate,

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18 a control unit for providing said control signal identifying a predetermined

19 portion of non-unique, invariant content which is to be added to said second data

20 stream of data entities, and

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22 wherein said data stream processing element in response to said control

23 signal adds said predetermined portion of non-unique, invariant content to said

24 second data stream of data entities thereby generating said first data stream of

25 data entities at the first line rate.

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1 17. (Amended) A data expansion demultiplexer apparatus comprising



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3 (1) a data stream demultiplexer for demultiplexing a received multiplexed data  
4 stream into a plurality of second data streams and

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6 (2) a plurality of data stream expander apparatuses, each for processing one of the  
7 plurality of second data streams, each data stream expander apparatus including

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9 a data stream processing element for receiving a second data stream of  
10 data entities at a second line rate, each data entity including a data packet and a  
11 gap, and responsive to a control signal for generating a first stream of data entities  
12 at a first line rate which is greater than the second line rate,

13

14 a control unit for providing said control signal identifying a predetermined  
15 portion of non-unique, invariant content which is to be added to said second data  
16 stream of data entities, said control unit using pre-knowledge to identify said  
17 predetermined portion of non-unique, invariant content which is to be added to  
18 said second data stream of data entities, and

19

20 wherein said data stream processing element in response to said control  
21 signal adds said predetermined portion of non-unique, invariant content to a data  
22 packet or gap of one or more data entities of said second data stream of data

23 ~~entities~~ thereby generating said first data stream of data entities at the first line  
24 rate.

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1 18. (Amended) A data expansion demultiplexer apparatus comprising

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3 (1) a data stream demultiplexer for demultiplexing a received multiplexed data  
4 stream into a plurality of second data streams and

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6 (2) a plurality of data stream expander apparatuses, each for processing one of the  
7 plurality of second data streams, each data stream expander apparatus including

8

9 a data stream processing element for receiving a second data stream of  
10 data entities at a second line rate and responsive to a control signal for generating  
11 a first stream of data entities at a first line rate which is greater than the second  
12 line rate,

13

14 a control unit for providing said control signal identifying a predetermined  
15 portion of non-unique, invariant content which is to be added to said second data  
16 stream of data entities, and

17

18 wherein said data stream processing element in response to said control  
19 signal adds said predetermined portion of non-unique, invariant content to said

20 second data stream of data entities thereby generating said first data stream of  
21 data entities at the first line rate ~~The the~~ data expansion demultiplexer apparatus  
22 ~~of claim 17 including~~ further comprising  
23 eight data stream expansion apparatuses,  
24 wherein the data rate of the received multiplexed data stream is less than  
25 or equal to the SONET OC-192 line rate, and  
26 wherein at least one of the data stream expansion apparatuses receives a  
27 second data stream from the data stream demultiplexer and generates therefrom a  
28 gigabit Ethernet data stream at 1.25 Gb/s.

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1 19. (Amended) A method of operating a data stream compression

2 apparatus comprising the steps of:

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4 receiving a first stream of data entities at a first line rate, each data entity  
5 including a data packet and a gap,

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7 identifying a predetermined portion of non-unique, invariant content of said first  
8 stream of data entities; using pre-knowledge of the type of said first stream of data  
9 entities, and

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11 removing said predetermined portion of non-unique, invariant content from a data  
12 packet or gap of one or more data entities of said first stream ~~of data entities~~

13 thereby generating said second data stream of data entities at the second line rate,  
14 each second stream data entity including a data packet and a gap.

1 20. (Amended) A method of operating a data stream expansion apparatus  
2 comprising the steps of:

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4 receiving a second data stream of data entities at a second line rate, each data  
5 entity including a data packet and a gap,

6

7 identifying, using pre-knowledge information, a predetermined portion of non-  
8 unique, invariant content which is to be added to said second data stream of data  
9 entities, and

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11 adding said predetermined portion of non-unique, invariant content to a data

12 packet or gap of one or more data entities of said second data stream of data

13 ~~entities~~ thereby generating said first data stream of data entities at the first line

14 rate.